CLAIMS

We claim:

1. An optical waveguide device, comprising:

a first optical waveguide having a first end;

a second optical waveguide having a first end, the first ends of the waveguides being separated by a gap; and

an optical coupler extending across the gap between the first ends of the waveguides, the optical coupler comprising material including a waveguide region, the waveguide region having a shape defined by overlapping cones of light emitted from the first ends of the optical waveguides into the material.

2. The optical waveguide device of claim 2, wherein the material has a refractive index capable of being increased by exposing the material to light of a particular wavelength or wavelength band.

3. The optical waveguide device of claim 3, wherein exposing the material to the light of a particular wavelength or wavelength band causes the material to undergo cross-linking.

4. The optical waveguide device of claim 3, wherein the material undergoes cross-linking by one-photon absorption.

5. The optical waveguide device of claim 3, wherein the material undergoes cross-linking by two-photon absorption.

6. The optical waveguide device of claim 1, wherein:

the first and second optical waveguides each comprise a core surrounded by a cladding, the cladding having a index of refraction; and

in the waveguide region, the material has a refractive index greater than the refractive index of the cladding of the optical waveguides.

7. The optical waveguide device of claim 1, wherein:

the first optical waveguide comprises a first waveguide core and first cladding region, the first cladding region surrounding the first waveguide core, the first waveguide core and the first cladding region having respective refractive indices, the refractive index of the first cladding region being lower than the refractive index of the first waveguide core;

the second optical waveguide comprises a second waveguide core and second cladding region, the second cladding region surrounding the second waveguide core, the second waveguide core and the second cladding region having respective refractive indices, the refractive index of the second cladding region being lower than the refractive index of the second waveguide core; and

the waveguide region of the material has refractive index greater than the refractive indices of the first and second cladding regions.

8. The optical waveguide device of claim 1, wherein the first and second optical waveguides each comprise an optical fiber.

9. The optical waveguide device of claim 1, wherein:

the material included in the waveguide region has a first refractive index; and

the waveguide region is surrounded by a solid form of the material having a refractive index less than the first refractive index.

10. The optical waveguide device of claim 1, wherein:

the material included in the waveguide region has a first refractive index; and

the waveguide region is surrounded by a liquid form of the material having a refractive index less than the first refractive index.

11. A method for aligning optical waveguides, the method comprising:

providing a first optical waveguide and a second optical waveguide;

axially aligning the first and second optical waveguides leaving a gap between adjacent ends of the aligned waveguides;

filling the gap with a material having a refractive index capable of being increased by exposing the material to light; and

exposing the material to conical beams of light emitted from the adjacent ends of the waveguides, the exposing increasing the refractive index of the material in a region in which the beams of light overlap.

12. The method of claim 11, further comprising uniformly exposing the material to light of an intensity less than the intensity in the region.

13. The method of claim 11, wherein the exposing comprises propagating incoherent light of the same wavelength through both optical waveguides.

14. The method of claim 11, wherein the exposing comprises propagating light of a different wavelength through each of the optical waveguides.

15. The method of claim 11, wherein the exposing increases the refractive index of the material by causing the material to undergo cross-linking.

16. The method of claim 15, wherein the cross-linking is the result of one-photon absorption.

17. The method of claim 15, wherein the cross-linking is the result of two-photon absorption.

18. The method of claim 11, wherein the first and second optical waveguides each comprise an optical fiber.